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Unpacking 'regime resistance' in low-carbon transitions: The case of the British Capacity Market

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ABSTRACT

The ability of powerful incumbent actors to resist technological or institutional changes that threaten their vested interests is a core part of the literature on sustainable energy transitions, but more often asserted in general than tested in specific cases. This article presents analysis of a detailed study of the introduction of a Capacity Market (CM) for electricity in Great Britain in the period 2010–2011, using a process tracing approach. The study finds evidence to support the view that large electricity generators have a significant degree of structural power in relation to decision makers, that such companies did lobby the government through the CM policy process, and that the ideas deployed had an effect on the shape of the CM. However, there were also divisions amongst the large generating companies on whether they wanted a CM or not, and what its design should be. We also show that the institutional circumstances of the CM policy process were quite specific, giving opportunities for lobbying that may not be present in other cases. We conclude it is essential to have an analysis of incumbent power that is contingent on institutional context, the specific nature of interests and the deployment of ideas. To counter incumbent power and structural dependency during sustainable energy transformation, an independent but legitimate body is needed to the direction of policy.

1. Introduction

The ability of large powerful incumbent actors to resist changes that threaten their vested interests is an important theme in the literature on sustainable energy transitions. Unruh's pioneering work on 'carbon lock-in' noted the ways in which: 'constituencies can draw law makers in by lobbying officials for support and preferential treatment of an existing technological system.' ([1]: 825). Within the socio-technical systems literature, which uses the concept of a socio-technical 'regime', the influence of energy sector incumbents in seeking to slow or prevent low-carbon[1] energy transitions has been framed as 'regime resistance' [2].

This view of resistance to change by incumbents in the energy sector is highly plausible, yet it is much more often asserted in general than tested in specific cases. This paper focuses in detail on one example: the introduction and design of a Capacity Market (CM) for electricity in Great Britain. The CM formed part of a wider set of policies known as the Electricity Market Reform (EMR), which was intended to lead to accelerated investment in low-carbon electricity generation in the form of new nuclear power and renewables. The concern was that a rise in variable renewables would increase the level and uncertainty of revenue for conventional generation capacity through lower and more volatile wholesale prices, and that this would deter the investment in such capacity that would be needed to provide flexibility in a future system with variable net demand. The CM was intended to address this concern, by providing a payment to some generating plants or demand response providers just for being available. It takes the form of an auction, conducted by a central buyer, into which owners of resources can bid. Winners are then rewarded with contracts for availability, and additional payments in case they are called on. To date, auctions have led to total capacity payments of the order of £3.8 billion, 90 per cent of which will go to owners of existing power plants.[2]

A widely held view amongst observers of the energy industry is that the formulation and design of the CM was heavily influenced by

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[1] Some argue that because future energy systems may still use hydro-carbons in the form of biomass and power-to-methane, energy transitions should be defined as moving away from fossil-based energy (i.e. 'de-fossilisation') rather than decarbonisation *per se*. Here we note this debate but use the conventional terminology of low carbon and decarbonisation.

[2] Across the main T-4 and T-1 auctions up to the end of 2018 (https://www.emrdeliverybody.com/cm/home.aspx)

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lobbying from large powerful companies that own generation assets [3,4,5]. It is consistent with the idea that large powerful energy companies in Britain shape energy policy more broadly (e.g. [6]). This article tests this view. Despite the widespread assumption of the power and activities of incumbents in lobbying, detailed studies of the process are relatively rare,[3] and this is one of the key contributions of this article.

We take Geels' [2] concept of 'regime resistance' as a starting point. However, drawing on more detailed research on the influence of powerful actors in areas such as innovation policy [7] and the financial sector [8], we argue that the deployment of structural power in any one case will depend on how interests are constructed, the institutional opportunities for influencing policy, and the ideas used by corporate actors. Examining these factors in the case of the CM thus involves 'unpacking' regime resistance, in order to understand exactly how, and how far, it has worked.

We find evidence that a number of large generating companies did influence the CM policy process, and that political incentives for government point to a high degree of structural power for companies, which can therefore be seen as 'incumbents' (we define this term further below). However, there are other key aspects of the CM policy process that are not well-captured in the 'regime resistance' approach, including divisions amongst the large generating companies on whether they wanted a CM or not, and what its design should be. We also show that the institutional context for the CM policy process was quite specific, giving opportunities for lobbying companies that may not be present in other cases. We conclude that in order to understand the operation of regime resistance in sustainable energy transitions, it is essential to have an analysis of incumbent power that is contingent on the specific nature of interests, institutional context and the particular ideas deployed in lobbying.

In exploring the Capacity Market case study, we draw on a range of sources, but two are particularly important: a set of interviews with individuals who had participated in or were close observers of decision making in the CM process (see Appendix 1 for details), and consultation documents published by the government and submissions to those consultations.

The remainder of the article is organised as follows. In the next two sections we lay out the analytical framework and the methodological approach. Section 4 provides context by briefly laying out the context for the CM. Evidence on the CM policy process is then laid out in Section 5, with a particular focus on the decision to adopt a mechanism and on its overall design. In Section 6 we conclude, revisiting the concept of regime resistance in light of this evidence, and briefly exploring implications for our understanding of energy transitions and for the energy policy making process.

2. Theorising 'regime resistance'

The concept of a 'regime' in energy systems is most associated with the 'multi-level perspective' [9,10]. This formulation involves three different conceptual 'levels': 'niches', in which new technologies are developed and nurtured, usually protected from competitive pressures; 'landscapes', which provide a set of deep structural trends that provide an external context, and 'regimes'. The regime for any technological system constitutes mainstream ways of realising various social functions, and provides the 'selection environment' for new technologies and other innovations [[11]: 440].

Early formulations of the multi-level perspective were criticised for paying insufficient attention to power and politics [12,13,14], which has led to a new literature on politics in socio-technical transitions [15]. In the case of the socio-technical regime, the starting point has been a focus on the processes by which regime stability is actively maintained [16], especially by incumbent companies (e.g. [17,18]).

One particularly influential contribution has been provided by Geels [2], who applies his framework to the British electricity system, which makes it particularly apposite here. Geels argues that policy makers and incumbent firms can be seen as forming a 'core regime level alliance' (p 27), based on aligned interests that arise out of mutual dependencies. Companies rely on governments not only for the general institutions of property rights and rules of exchange, but also for specific interventions including subsidies and taxes. At the same time, society is systematically dependent on economic growth, and so it is rational for governments to yield to corporate demands for supportive policies. Others, such as Wilks [6] and Newell and Paterson [19] argue that this 'structural dependency' argument is particularly applicable to the energy sector.[4] Certainly, the powerful political incentive to maintain a reliable electricity system in a modern economy [21] means that decision makers may be particularly susceptible to discourses of crisis created by incumbents.[5]

Geels ([2]: 26–27) goes on to argue that companies in the regime seek to influence policy makers through a set of 'relational networks and close contacts', with frequent consultation of large companies by senior officials, and through lobbying, information and more confrontational strategies such as legal challenge.[6] Their aim is an internalisation of the interests and ideas of industries by policy makers.

Geels' approach is useful in drawing attention to the idea of structural power in energy transitions, the considerable resources of large corporate actors, and their close relationships with policy makers. However, there is some ambiguity as to whether incumbents will *necessarily* dominate policy formulation, and will therefore always succeed in resisting changes that threaten them. While the framework is not inconsistent with the idea that corporate actors may fail to capture the policy process, much of the discussion, especially of British electricity policy ([2]: 28–35), appear to assume the inevitability of its success.

Other accounts, such as Mitchell [23], and indeed later work by Geels himself [24,25] suggest a more nuanced and dynamic view, where incumbents do not simply resist but rather seek to shape change, gradually reorienting the regime by adapting but maintaining a high degree of influence, if not control. In this context, the CM might be understood as an instance of incumbents engaging in 'defensive institutional work' [17,25], while at the same time seeking to shape the development of new institutions for low carbon energy in the wider EMR.

It is thus clear first that regime actors will not always simply resist change, and second that a fully deterministic interpretation of the structural power of regime actors is not convincing; as ([26]: 362) puts it, '*Structural* analysis explains the possible; *historical* analysis explains the actual'. This suggests the need for an approach in which the effects of structural power by corporate actors in any one case, such as the CM, are seen as explicitly contingent on the conditions for the deployment of that power. We need to look at exactly why and how incumbents sought to shape policy, i.e. the details of the 'enactment' of regime resistance or maintenance [24], and what determined success or failure.

A useful approach to this unpacking of regime resistance is to look at the interplay between interests, institutions and ideas, as developed by Kern [7] in a study of low-carbon innovation organisations and by Bell and Hindmoor in their work on structural power in finance policy

[3] See Kern [7] for an exception.

[4] A similar set of concepts (although using a different terminology) is to be found in the field theory used by Hess [18] and Kungl [20].

[5] Rosenbloom [22] gives an account of an ultimately unsuccessful attempt by incumbents to deploy such discourses to oppose coal phase-out in Ontario.

[6] See also Smink et al. [17], who draw on the concept of 'corporate political activities' in the strategic management literature, defined as 'corporate attempts to shape government policy in ways favourable to the firm' (Hillman et al 2004: 838).

[8,27]. These authors focus on how the interests of incumbents are constructed, and how ideas are deployed by those actors in the process of policy development. For corporate actors, the literature suggests that the construction of interests will emerge not only from material factors, such as assets, but also from sometimes complex internal processes that can differ across companies quite considerably according to internal organisation, often giving rise to different specific corporate cultures or world views [6,28], and differing degrees of commitment to existing ideas within the regime [29].

Kern [7] also analyses how far existing institutions (and the dominant discourses underlying them) constrain or facilitate the emergence of new policy ideas. For Bell and Hindmoor [8], the focus is on the institutional arrangements that facilitate access to decision makers by powerful corporate actors. The (somewhat common sense) conclusion emerging from studies like these is that incumbents will be more successful in pursuing their interests through the deployment of ideas where the institutional landscape is more supportive.

In this study of the CM we also adopt this approach. We examine the construction of interests of potential incumbent corporate actors, the institutional context for their relationship with decision makers, and the ideational strategies that they deployed in relation to those decision makers. The overall aim is to assess what evidence there is that decision makers internalised the ideas and interests of incumbent firms, and what role the institutional context for influence played.

A final conceptual issue concerns the issue of 'incumbency' in the case of energy regimes. As Lowes et al. [30] point out, the concept of incumbency has been used widely in the literature on socio-technical transitions without a clear, rigorous definition. Their view is that an incumbent is:

> '…currently active in the socio-technical system or a part thereof and therefore likely to be or have been involved in unsustainable practices. Incumbents have the economic, social or technological capacity to influence system change.' ([30]: 32)[7]

The most essential part of this definition lies in *the capability of existing actors to influence change (including resisting it) through strategic action*. Such action includes not only Schumpeterian market responses, but also the shaping of policies and rules that protect the interests of incumbents and entrench their market dominance.

Here, whether or not large existing companies in the energy sector undertake such actions successfully is the topic of study, so we cannot make a prior assumption that these companies are actually incumbents in this sense; rather they can be identified as such only through the research process itself. Nevertheless, it is still possible at the outset to identify a set of actors that one can plausibly expect to act as incumbents, which we do below in Section 5.1. We can say that actors can be identified as potential incumbents in a particular context only if two conditions are true. First, they must have the power to act strategically (e.g. that they have access to decision-makers, to resources and capabilities for effective lobbying, or for strategic market dominance, that they are large enough to benefit from economies of scale etc.). Second, they must have interests for strategic action in that context (e.g. sunk investments they wish to protect). Consistent with our approach to incumbency, we would see it as a context specific feature (companies may act as incumbents in some situations but not others) and of course their interests may change over time.

3. Methodology

The focus here is on the politics of development of a specific policy, and so a case study approach with a focus on process was adopted as the appropriate methodological choice.[8] We draw on methods developed in the process-tracing literature (e.g. [33,34]), which seeks to identify causal mechanisms that produce outcomes through identifying specific *entities* at each stage of a causal chain, along with *activities* that these entities undertake [[33]: 46–47]. Within this approach, the focus here is specifically on theory-testing, as opposed to building new theories or identifying a minimally sufficient explanation of a particular outcome.

In this case, arising from the theoretical discussion above, the entities we are interested in are large corporate actors (hypothesised as incumbents) and senior decision makers (politicians and officials), while the activities include networking, the transfer of ideas and the deployment of corporate resources for influence in various forms including lobbying.

In the process-tracing approach, some care is also given to the formation of *evidence*, defined as observations or raw data which is then assessed for accuracy and interpreted in context. Unlike extended case studies in the ethnographic tradition, a participant observation approach was not possible here. Instead, we use evidence from a range of different sources, but two of these are particularly important:

- *Interviews* with individuals who had participated in decision making in the CM policy process, who had been in corporations communicating with decision makers, or who had been close observers, focusing on the issues arising from the theoretical discussion above, i.e. construction of interests, institutional context and ideational strategies (see Annex 1 for details). There is some sensitivity about the topic of corporate influence, with both corporate and government interviewees having an incentive to deny or play down the possibility that it occurred, as noted above. We attempted to address this problem by using interview schedules that did not ask direct questions about lobbying, but it is still a possibility that government and corporate interviewees played down the role it played. Interviewees with independent observers are a useful source of triangulation here, but whereas their evidence may not be biased, it may also be less accurate, as such observers were not always present in discussions between decision makers and corporate actors, nor did they participate directly in the formulation of policy. It should be borne in mind that the events being studied occurred mainly in the period from the late 2000s up to 2014, whereas the interviews were undertaken during 2016–18, and the memories of interviewees, especially about timing and sequencing of events, may not always be accurate. As a result other, especially documentary, forms of evidence are important [35].
- *Consultation documents and submissions*. As described below, there were a number of points in the evolution of the CM where the government published consultation documents for policy options, and where actors then sent in submissions giving their views. In particular we draw on submissions to the December 2010 EMR consultation [36] and the July 2011 consultation on the Capacity Market [37].[9] We also draw on submissions and oral evidence given to the 2011 inquiry on the EMR conducted by the House of Commons Energy and Climate Change Committee [38].

In addition, the paper also draws on a range of other sources including records of meetings between corporate and other actors with Ministers, speeches and statements by participants and observers, especially politicians and corporate CEOs, and media reports.

[7] This is not dissimilar from another recent approach by Johnstone et al. [31].

[8] Process tracing adopts a realist ontology and arguably differs from earlier ethnographic extended case study approaches (e.g. [32]) which placed greater emphasis on reflexivity and inter-subjectivity.

[9] These responses can be found at: https://www.gov.uk/government/consultations/electricity-market-reform and https://www.gov.uk/government/consultations/possible-models-for-a-capacity-mechanism respectively.

4. The origins of the capacity market

In the late 2000s, UK government commitments to decarbonise and to promote renewable electricity became more serious, with the adoption of the 2008 Climate Change Act and the 2009 EU Renewables Directive. At the same time, the governing Labour party had reversed its earlier stance on nuclear and was keen to see new plants built ([23]: 105–115). Responding to government signalling, all the Big Six companies were involved in one of the competing nuclear new build consortia.[10] However, new nuclear power could not be supported by the Renewables Obligation, and a specific subsidy would be ruled out under State Aid rules. Both government and industry therefore had an interest in a support mechanism that could be framed as being for 'low carbon' generation.

The result was a set of policies known as the Electricity Market Reform (EMR), developed over the period 2009–2013.[11] The EMR involved four elements: support for 'low carbon' electricity; a plant-level Emissions Performance Standard for greenhouse gas emissions; a Carbon Price Support for allowances in the EU Emissions Trading Scheme, and a Capacity Market.

Wholesale electricity markets can take many forms, but the simplest is the 'energy-only' market, where generators are offered payment only on the basis of the energy (e.g. MWh) they can provide. Generators will tend to bid into such markets only when prices exceed their short-run cost of generation. Those with higher costs (typically those requiring fuels, such as coal or gas) are able to recover their long-term costs (including repayment of debt) only when prices peak during periods of high demand. The classic argument for a capacity mechanism is therefore based on a potential 'missing money' problem in energy-only markets where regulators place caps on peak pricing, meaning that potential investors fear that they may not be able to recover sufficient revenue to cover their long-run costs [39].

However, much of the debate in the case of the Capacity Market was actually about a new fear of 'missing markets' ([40]: 66) resulting from uncertainty created by high levels of variable renewables leading to reduced and more volatile wholesale prices, and so a collapse in investment in conventional generation capacity [41]. As both renewables and new nuclear had frameworks of support in the EMR, the argument was that conventional thermal capacity needed for back-up, especially combined-cycle gas turbine (CCGT) plants, would also need a support policy.

It is important to note that was no clear consensus amongst economists regarding capacity interventions. The International Energy Agency ([21]: 97) noted the 'intense academic debate' between advocates of energy-only markets and capacity markets. Within the UK electricity industry, attempts to develop a common position had historically been unsuccessful ([42]: 297). Equally, there was no model that dominated in real-world electricity markets, with some jurisdictions having energy-only markets, some having capacity payments and some using capacity markets [43,44]. In Britain the market itself had moved between a capacity payment system from 1989 to 2001, and then to an energy-only between 2001 and 2014. The decision to adopt a Capacity Market cannot therefore simply be ascribed to a well-established theoretical consensus and a convergence in policy practice around the world.

[10] Interviews 1 and 4. The consortia consisted of: E.ON and RWE seeking to build two plants at Wylfa on Anglesey and Oldbury near Bristol; EDF and Centrica also seeking to build two plants at Hinkley Point in Somerset and Sizewell in Suffolk, and SSE and Iberdrola (owner of Scottish Power) together with GDF Suez seeking to build one plant in Cumbria.

[11] https://www.ofgem.gov.uk/electricity/wholesale-market/market-efficiency-review-and-reform/electricity-market-reform-emr.

5. The politics of the Capacity Market

The development of the CM took place over a period of approximately five years. In this study we focus on two key early decisions that were fundamental to the eventual policy. The first of these was the *decision to develop any type of capacity intervention at all.* The main shift appeared to happen between early 2010, when a mechanism was not on the immediate agenda, and the end of 2011 when the decision to introduce a capacity market was formally announced. A second key decision point was about *the design of intervention*. Throughout 2010 and most of 2011 the government's preferred option was an approach known as 'strategic reserve', but by the time the policy was announced at the end of 2011 this had abandoned in favour of a 'market-wide' approach. These processes are explored in Sections 5.2 and 5.3 respectively, but first we examine the key regime actors, their interests and their inter-relationships.

5.1. Regime actors and networks

In Section 2 above, we argued that potential incumbents could be identified as those companies that had both the power to strategically influence policy and interests in doing so. Here, we argue that two groups of companies in the British electricity regime meet these criteria in relation to the development of the CM. The first is the 'Big Six'[12] companies which are vertically integrated in electricity generation and supply. Their generation portfolios were dominated by fossil-fuel thermal capacity, split fairly evenly between gas- and coal-fired capacity, but with Centrica and EDF also having significant nuclear assets (Fig. 1).

While the Big Six were the most visible and powerful corporate actors, there was also a group of 'second tier' electricity companies, which included members of the Independent Generators Group (International Power, DONG UK, Eggborough Power Ltd, Drax Power Ltd, InterGen, and ConocoPhillips), and ESB International. These companies were also heavily invested in thermal fossil fuel capacity (Fig. 2).

Between them, the Big Six and the second tier generators owned 96% of British electricity generating capacity in 2012, and 94% of fossil-fuel thermal generation [45]. Since the bulk of their sunk investments were in existing capacity, these companies could be expected to have an interest in a policy intervention that would reward them simply for holding such assets. This is especially the case for coal-fired plants since the costs of maintaining these were increasing (and to a degree uncertain) under EU Directives for local pollution reduction,[13] whilst free allocations within the EU emissions trading scheme were to end from 2013.

However, while a majority of Big Six and second-tier generating companies were in favour of the introduction of a capacity mechanism in the December 2010 EMR Consultation, four companies (E.On, RWE, ESB International and DONG UK) were opposed (Table 1).

Some observers and corporate participants argue that opposition to a capacity mechanism was linked to recent and on-going investment in new CCGT plants.[14] Revenue for older gas-fired plants would be heavily dependent on peak pricing and so more exposed to uncertainty with increasing renewables. Companies with such plants could therefore be expected to be in favour of a capacity intervention. Conversely those who were building or had recently built new CCGT would seek to run these at base load, and might be expected to be less supportive. There is some evidence to support this view, since the four companies opposed

[12] The generation arms of these companies are: Centrica, EDF Energy, E.On, RWE, Scottish and Southern Energy and Scottish Power.

[13] i.e. the 2001 Large Combustion Plant Directive and the 2010 Industrial Emissions Directive.

[14] Interview 3, [[45]: 3].

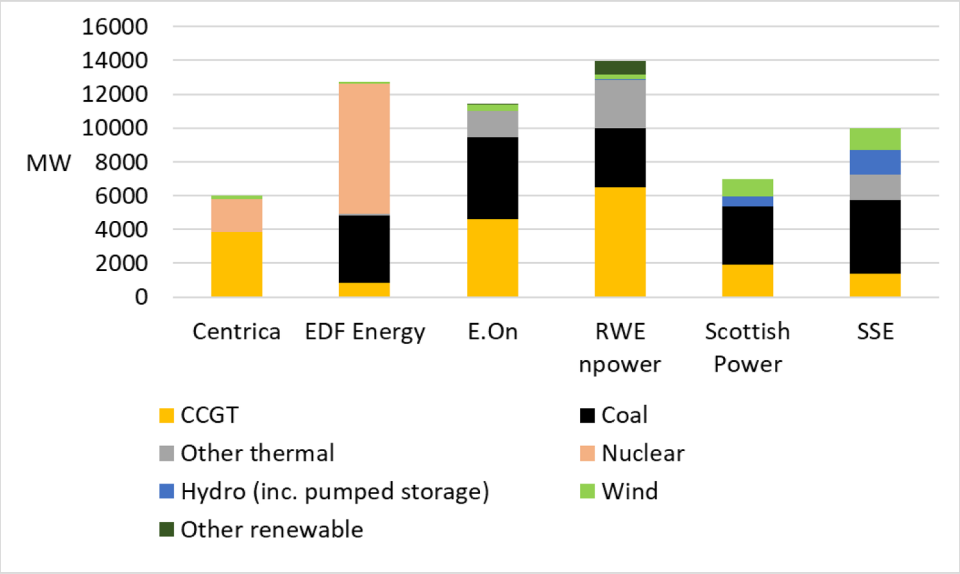

Fig. 1. Big Six generating portfolios, 2012.
[46].

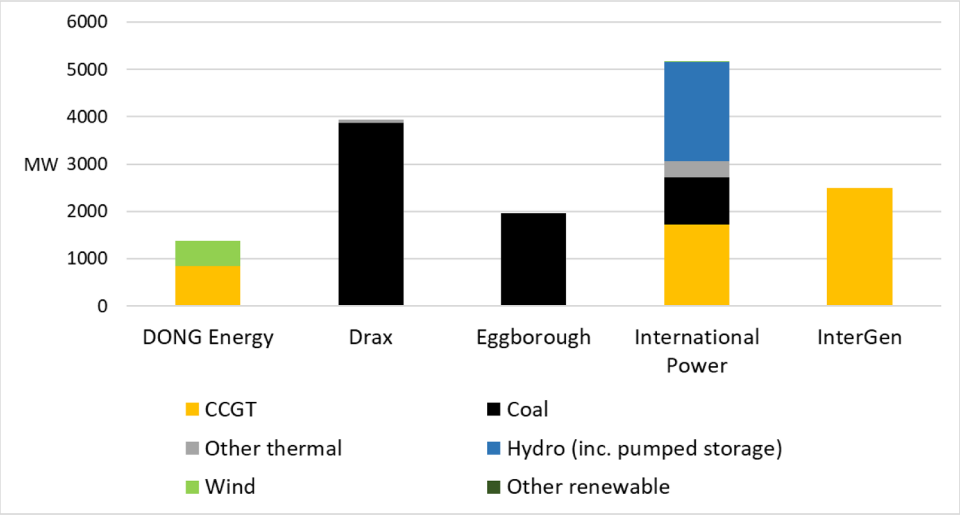

Fig. 2. Selected second-tier company generating portfolios, 2012.
[46].

Table 1
Position of corporate actors on capacity intervention in 2010 EMR consultation.
Source: https://www.gov.uk/government/consultations/electricity-market-reform.

	In favour of capacity intervention	Opposed to capacity intervention
Big Six	Centrica, EDF, SSE, Scottish Power	E.ON, RWE
Second-tier generators	International Power, Drax, InterGen, ConocoPhillips	ESB International, DONG

to a capacity mechanism in 2010 all had large investments (relative to their portfolios) in new CCGT plants, whereas most of the others did not [45,46]. It is also possible that distinctive corporate cultures played some role in the different positions of companies. In particular, the senior management of RWE in the UK appeared particularly committed to the idea of making energy markets work without intervention, and there were similar views at E.On.[15]

The other central regime actor was the Department of Energy and Climate Change (DECC), where the EMR policy process was located. The detailed policy development of the CM was carried out by officials, while Ministers were engaged with the broad outlines of the EMR, and on high-profile issues such as support for new nuclear power. Public concern over this period focused more on high energy prices, which as a result also occupied much political attention. However, while public awareness of the CM was low, it is clear that there was a powerful underlying political driver for senior decision makers to maintain electricity system security. In the words of a senior official:

'The thing you've got to remember…is, about all of us actually, not

[15] Interview 3

just Ministers…Ministers and officials… there is one thing that is going to get you fired, and that is this [lights going out]. So to some extent price is a political problem, but we would all be clearing our desks if…'[16]

Throughout this period, large generating companies had contact with decision makers through a number of routes. Ministers had formal meetings with senior representatives from the Big Six and the second-tier generating companies, although they also met with representatives of many other organisations and companies.[17] Probably more important for the Big Six were the opportunities for informal discussion arranged through the UK Business Council for Sustainable Energy (UKBCSE), an organisation originally founded in 2001 which evolved into a forum for chief executives from the Big Six and National Grid to meet both amongst themselves and with senior figures in government.[18] By the mid-2000s, it was the most important energy industry forum for discussion of policy, and a number of interviewees identified it as having a key role in contacts between the Big Six and DECC.[19] The UKBCSE hosted regular informal dinners with the Secretary of State and Permanent Secretary,[20] as well as meetings with lower-level officials. It also provided an important coordinating arena for companies to discuss and collate their positions on the EMR, with a working group and an EMR strategy day for senior staff in the autumn of 2010.[21] The second tier electricity generators also had their own association, the Independent Generators Group, which while it had less access than the UKBCSE, played an important role in coordinating company efforts to influence government.

5.2. Deciding to have a capacity intervention

The first key decision was that to introduce a capacity mechanism of some sort. Debates about the potential effects of renewables growth on investment in other generating plants and resulting capacity margins began to emerge in the late 2000s. In March 2010, the view of the government was still that the existing energy-only market price signals would be adequate to bring forward the investment needed ([47]: 12–13). However, following the general election in May 2010, a new Conservative-Liberal Coalition government came to power. According to a close observer, a core driver for the Coalition was that 'We're the government for action' in comparison with the previous administration:

'…in the new government, politically, at that time there was a sense that the discussion had previously been theoretical and it now because more practical and more immediate…So when Coalition government politicians came in they instructed DECC officials to get on with it.'[22]

There is also some evidence that decision makers were becoming increasingly concerned about a capacity crunch at this point. Over the autumn of 2010, as officials prepared an EMR Consultation document, they commissioned new modelling on expected capacity margins out to the mid-2020s [49]. This modelling differed from a previous exercise in 2009 [50], in that it showed a sharp fall in the capacity margin in the late 2010s under the existing energy-only market. The reason for the difference appears to be that assumptions about the effects of closures of coal-fired and oil-fired plants under the EU Directive on Industrial Emissions were included in the 2010 projections but not earlier modelling.

These results formed part of the context for officials and politicians. However, it is also clear that decisions were not based purely on quantified risks from modelling, but were also strongly influenced by the basic uncertainties in predicting demand and capacity in a privatised market and the fear of the political consequences of the downside risk. According to a senior official involved in the process:

'...how do you make sense of the economic analysis around this? Security of supply is a particular problem, because the numbers are geared, and so you divide one number by the other. And so if you imagine you've got 100 units of demand, and you've got 120 units of supply, you've got a nice comfortable 20% capacity margin. Your advice to Ministers would be: "There's some risk here, you can never get rid of all risk, but that's pretty comfortable"…But it doesn't take many units of demand to go up, let's say you're out by 5% on demand, which is not impossible three or four years out, in fact its highly likely. You are one or two stations worth, ten units are out because you haven't understood what the economics of individual plants are…whatever it is, you can end up fairly quickly in a world where you've got 110 over 105, and suddenly you've got a really big security of supply problem.'[23]

Politicians in the newly elected government had the same concerns; according to a political adviser in DECC, 'Chris Huhne [the Secretary of State] would always ask about the lights going out.'[24] However, in late 2010 Ministers were not yet too worried, and it appears that a capacity intervention was seen at this stage a more of an insurance policy:

'…views on this [capacity adequacy] definitely changed over time, but not as early as winter 2010. It was not a major part of the narrative. Maybe more in 2011. But overall this rose incrementally as an issue, rather than a big shift…The capacity market was always talked about as a backstop measure. In discussions early on, the idea was to take powers in case we needed them.'[25]

In December 2010 the Coalition government published its EMR Consultation document, which proposed a capacity intervention ([36]: 31–32). The majority of generating companies responded by supporting the government's proposal, and their submissions generally echoed and amplified the arguments for it made in the consultation document. Most submissions focused on the idea that an anticipated increase in intermittent renewable generation would create revenue uncertainty, so that existing energy-only market arrangements would not be sufficient for future investment in generating capacity, and lead to a capacity crunch [51–52]. The implicit threat of an 'investment strike' was perhaps stated most clearly in InterGen's submission:

'InterGen can only commit to continuing to invest in the UK if the outcome of the EMR allows us to do so… even if capacity margins are tight, InterGen's planned UK projects will be unable to obtain finance…to support their construction unless a capacity mechanism for flexible generation is introduced.'

([53]: 1)

These companies drew on a modelling exercise on the effects of wind intermittency on markets that had been commissioned from the consultancy firm Pöyry in July 2009 [54] on behalf of Centrica, DONG, EirGrd, ESBI, National Grid and Renewable Energy Systems, and which compared the British energy-only market unfavourably with the Irish market which did have capacity payments.

[16] Interview 5

[17] For details see: http://webarchive.nationalarchives.gov.uk/20130102164008/http:/www.decc.gov.uk/en/content/cms/accesstoinform/registers/ministermtgs/ministermtgs.aspx

[18] According to a close observer, in one early event, a Minister observed that it had been years since he had seen all of the Big Six chief executives together in a meeting (Interview 9)

[19] Interviews 1 and 6

[20] Interview 7

[21] Interview 1

[22] Interview 7. See also Huhne [48].

[23] Interview 5

[24] Interview 2

[25] Interview 2. See also comments by Chris Huhne to the Energy and Climate Change Committee in early 2011 ([38]: Ev 116).

Despite acknowledging that the capacity margin in 2010 was still generous, a number of companies pressed for immediate action to get a mechanism in place [55,52,56].[26] Over this period the generating companies continued to meet with Ministers, with Chris Huhne meeting RWE, EdF, SSE, the IGG and Centrica (twice) between January and June 2011, and Energy Minister Charles Hendry meeting SSE and Centrica again twice.[27]

A minority of the large generators were opposed to the proposal for an intervention, arguing that the case had not yet been made, and that if relatively minor reforms were undertaken to sharpen price incentives in the energy-only market then sufficient investment would be forthcoming [57–58]. Reservations about a capacity mechanism were also expressed by a number of actors who, while not necessarily part of a 'core regime alliance', were politically important, including the Confederation of British Industry, GE Energy, and the centre-right think-tank Policy Exchange [38], as well as National Grid [59].

Nevertheless, when the government published the follow up to the EMR Consultation, in the form of the July 2011 White Paper, *Planning our Electric Future*, it interpreted the state of this debate as showing 'a broad consensus that current market arrangements will not deliver the scale of long-term investment needed' ([37]: 6), and re-stated the missing money and impact of intermittent renewables arguments (ibid: 66–67). The White Paper confirmed the proposal to legislate for a new capacity mechanism (ibid: 9).

5.3. From a strategic reserve to a market-wide capacity mechanism

At this point the debate about whether there would be a capacity mechanism or not was effectively over, and the focus shifted to the particular form that it would take. In the 2010 Consultation document the proposal was for 'targeted payments to encourage security of supply' ([36]: 6), in which a central body would procure a relatively small volume of new capacity through a competitive process, which would then be withheld from the wholesale electricity market and despatched only when prices rose above a certain level. This is generally known as a 'Strategic Reserve' (SR).

As shown in Fig. 3, the SR option is distinct from 'market-wide' approaches, in which contracted capacity is not withheld from the market, and so can earn both payments for capacity and for generation as normal. There are several possible variants of market-wide mechanisms, including the capacity auction which was eventually chosen later in the process.

Companies with existing generation assets could be expected to prefer a market-wide mechanism, since an SR approach would mainly benefit new plants. Owners of existing plants would not only miss out on capacity payments, but would also suffer from suppression of peak prices in the wholesale market. A market-wide mechanism could also be expected to reduce peak prices, but the resulting risk of lower market revenues would be offset by the higher chance of winning capacity payments available to much greater range of market participants. In the view of one observer, a preference for a market-wide design was 'absolutely a commercial no-brainer.'[28]

Some of the major generators started to lobby on this aspect of design early on. Scottish Power, Centrica and the IGG were all strong supporters of the market-wide approach and met with ministers over the autumn of 2010. According to one close observer, the IGG:

'…said…that they had a meeting with the minister, at which they huffed and puffed about capacity mechanism, being targeted rather than market wide. And the minister said "Well OK, send me a paper which explains why market wide is the right thing to do".'[29]

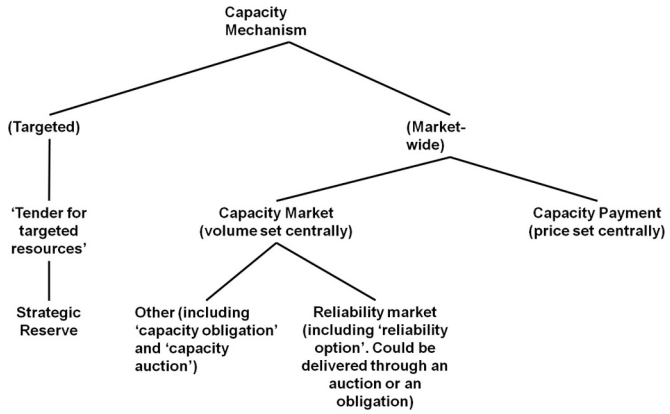

Fig. 3. Possible models for a capacity mechanism ([37]: 164).

The IGG subsequently commissioned a critical assessment of the SR option and to make the argument for a market wide approach, which they then sent to the government [60]. In their submissions to the EMR Consultation document, a clear majority of the Big Six and the IGG were opposed to the SR (Table 2).

In making their case against the SR approach, companies focused on what is referred to as the 'slippery slope' problem [57,61,62,56,63,58,53,64], Drax [2010]. This is summarised in ([64]: 13) as follows:

'With the potential for significant volumes of centrally-tendered plant [i.e. a Strategic Reserve]…market-based investment would be sterilised. Developers would be concerned that if they did invest this would be "crowded-out" by tendered plant and hence would hold back investment or may even strategically defer investment in the hope of securing a tender…This would all lead to a "slippery slope" – where an increasing amount of plant is tendered for and the role of the market is eroded.'

This argument was also made by a number of Big Six CEOs in the House of Commons Energy and Climate Change Select Committee enquiry on EMR ([38]: Ev 49-50) and in speeches (e.g. [65]).

A second argument made by some companies was that a targeted approach would not provide sufficient volume of despatchable capacity to ensure system security at times of high demand and low wind output, especially in winter during meteorological high pressure events that could last several days (e.g. [61,56,62]).

As with intervention in general, there were a few dissenting voices amongst the generating companies, especially ESB International, RWE and DONG. Their view was that the SR was the lesser of two evils as it would be less distorting for the wholesale market, especially if it were made clear that an SR mechanism would be used as a last resort at a very high price. Some companies were also sceptical about the volume argument against the SR, because of the scope for demand response by consumers from 2020 onwards and the possibility of using existing back-up plant sited at hospitals, water companies etc., which were currently under-utilised [66].

In July 2011, an EMR White Paper again put forward the SR as a preferred option, but included a number of proposed remedies, including clear despatch rules, to address the slippery slope issue ([37]: 166–167). However, in their responses most of the Big Six and second-tier generating companies dismissed these proposed remedies and

[26] This call for urgency was also made by senior managers in Big Six firms appearing before the Energy and Climate Change Select Committee in the spring of 2011 ([38]: Ev 47-51).

[27] http://webarchive.nationalarchives.gov.uk/20130102164008/http:/www.decc.gov.uk/en/content/cms/accesstoinform/registers/ministermtgs/ministermtgs.aspx

[28] Interview 7

[29] Interview 7

Table 2
Big Six and second-tier generator positions on the principle and form of capacity intervention in responses to 2010 EMR Consultation.
Source: https://www.gov.uk/government/consultations/electricity-market-reform.

	Preferred form of intervention Market-wide	Strategic Reserve	None
In favour	Centrica, EdF, SSE, Scottish Power, Intergen, International Power, Drax		RWE, ESB International
Opposed	DONG, E.On	Centrica, EdF, SSE, Scottish Power, Intergen, International Power, Drax	

repeated the arguments made earlier ([67,51,68,52,69–70]).

In December 2011, the government announced that it would now choose a market-wide approach, and a Capacity Market in particular ([71]: 22). The decision was taken despite the fact that the government's own cost-benefit analysis consistently supported the SR approach, a point that was later criticised by observers [4,72].

The slippery slope argument clearly had an influence on the decision. It was cited in the Technical Update ([71]: 29), and in the words of a senior official:

> '…the intervention was considered to be an insurance policy in a comfortable world that suddenly looked like it was going to be under more pressure given the new analysis, and I think given that analysis, the slippery slope argument felt much more compelling…'[30]

However, it appears that the government had also become increasingly concerned about the volume argument, with that concern symbolised by the idea of an extended winter anti-cyclone with low wind generation and high demand. A senior advisor in DECC recalled that the decision to go for a market-wide design:

> '…was also about scale; if this was a small requirement, a strategic reserve makes sense, if a bigger issue then a market wide approach is better… Throughout, there was concern about the infamous five still days in January'[31]

At the time, this was an issue for the rather distant future; in 2011 wind provided less than 4% of total electricity generated. The challenges of large swings in wind output were expected to materialise only from the mid-2020s. The basis in 2011 for understanding how frequent and extended such events were likely to be was fairly crude, as it is only more recently that meteorologists have started to undertake reanalysis of longer-term data (e.g. [73]).

However, the wider context for this concern was that from early 2011 onwards, the government began to come under increasing pressure from the large generators, and especially the Big Six, to get a capacity mechanism in place urgently. The capacity margin in the early 2010s was actually high by recent historical standards. The glut in capacity, together with relatively high gas prices, meant that the economics of gas-fired power generation was very difficult, and over the early 2010s a number of plants were mothballed or closed. It is clear that some companies used these closures to signal the possibility of a future capacity crunch and the urgency of signals for new investment, effectively reminding government of its structural dependency in relation to electricity supply. At the end of June 2011, just ahead of the publication of the EMR White Paper the CEO of Centrica, Sam Laidlaw, gave a speech (widely covered in the media) in which he claimed that:

> 'The clock is ticking. In my view, we as a nation have got one year in which to take action, or our carbon reduction targets may have to be sacrificed in the interests of safeguarding the security of our energy supplies.'[32]

The pressure continued through 2012 and 2013, with companies calling for a speeding up of the policy and for the CM to be established as quickly as possible. While the basis for this pressure was challenged (described as 'scaremongering' by Pollitt, quoted in [74]) the steady stream of warnings put enormous pressure on the government, and placed the focus on capacity rather than flexibility.

6. Conclusion and implications

Give the evidence presented in Section 5, how far can we say that decision makers internalised the ideas and interests of incumbent firms, and that the Capacity Market an instance of regime resistance? Firstly, it is clear that the British government did have a structural dependency on the large energy corporates, inasmuch as senior decision makers themselves perceived that they had a strong political incentive to 'keep the lights on', which provided leverage for corporates framing their commercial interests in terms of security of supply.

Second, there is clear evidence that the large generators were very active in their lobbying of government. In this lobbying they deployed both ideas and resources. A majority of the large generators pressed for a capacity intervention, through a diverse set of routes including consultations, private meetings, commissioned modelling and public statements. They deployed ideas – notably about 'missing money' and the effects of more variable renewables – in which they emphasised the public, rather than their own commercial, interest. On the issue of whether the intervention should be in the form of a Strategic Reserve or a market-wide mechanism, a majority of large generators lobbied for a market-wide approach, through a similar set of routes. They deployed ideas, notably the 'slippery slope' and the volume arguments, which again they framed in terms of the public good. Throughout the period from 2011 onwards, the large generators also built up pressure on the government to deliver a capacity mechanism quickly through the creation of a sense of urgency through statements about plant closures and a looming capacity crunch.

Third Big Six generators were both well-coordinated and benefitted from an unusually good opportunity for influence through informal senior level contacts with ministers and officials in the form of the UK Business Council for Sustainable Energy.

Did the government make these decisions *because* of this lobbying, i.e. because decision makers had internalised the interests and ideas of corporates? It is hard to prove causality – i.e. a 'smoking gun' test [33] – in part precisely because corporate actors made arguments for interventions in terms of the public interest, especially security of supply, for which decision makers also had an independent political incentive. In the absence of evidence for a smoking gun, another approach to judging

[30] Interview 5

[31] Interview 2. Senior government views may have been influenced a particularly cold period with low wind output in the winter of 2010 ([59]: 38). The Energy Minister at the time, Charles Hendry, told the Energy and Climate Change Committee in the spring of 2011 that: 'I think that what we learned from the period before December, when it was so cold and the wind was not blowing very much, is that the great challenge for us in this decade is how we move from the power being available when the resource is there to the power being available when the consumer needs it.' ECCC ([38]: Ev 116).

[32] Speech to the Economist energy summit, 23 June 2011, https://www.centrica.com/news/centrica-calls-honest-debate-uk-energy-security

the unique necessity of a factor in a causal chain is counterfactual analysis [75]. In this case this would mean considering what would have happened to the development of the CM had incumbents not lobbied.

On the basis of the evidence presented here we argue that it is possible that a capacity mechanism would still have been adopted. Incoming ministers in May 2010 were driven by the desire to be seen as a government of action, ahead of meetings and submissions from companies. They also seem to have been influenced by their own modelling of resource adequacy in the late 2010s and a desire, driven by political incentives, to err on the side of caution. The views of a majority of the large generators reinforced a position the government had already taken at the end of 2010.

By contrast, there was a clear shift in the government position over the course of 2011 on the design of an intervention, from Strategic Reserve to a market-wide approach. There is evidence that decision makers were influenced by the 'slippery slope' argument put forward by corporate actors, but in the end they seem to have been swayed more by the volume argument. Here it is more likely that lobbying played a direct causal role in the decision, and in its absence it is plausible that the original Strategic Reserve approach would have prevailed.

In several ways, the Capacity Market does therefore look like an example of 'regime resistance'. In particular it has propped up the existing assets of the large generating companies at the heart of the regime, which have been shown in this case to be acting as incumbents. While the government apparently hoped that the policy would lead to the construction of new gas plants, and demand side response aggregators early on hoped that it would help develop their industry, in fact the vast majority of rewards have gone to existing capacity.

However, there are also aspects of the CM story that are not so well accommodated within a simple regime resistance framework. One is the fact that the large generators were not a single bloc. Amongst both the Big Six and the IGG there were a minority of companies who defined their interests as opposed to a capacity intervention and to a market-wide approach, and who lobbied for these positions but failed to influence government sufficiently to secure what they wanted. The differences between this group of companies and the majority did not arise because of interests in emerging technological niches, but rather was due to their different investments *within the regime*.

Second, while the institutional context for provided by the UKBCSE was particularly conducive to influence, it is important to recognise that it was specific to its time, ending in 2012. Its successor organisation, EnergyUK, has a larger membership and does not provide the same opportunities for close coordination of a small number of senior corporate managers and decision makers.

We would argue that our findings have implications for the wider study of energy transitions. One is the importance of understanding the interests of actors as specific and constructed. From a methodological point of view, this implies that studies of changes in energy regimes should pay attention to and provide evidence for how interests are constructed, as in this work and similar studies (e.g. [7]). Substantively, it also emphasises the importance of allowing for divergences of interest amongst actors within energy regimes; the concepts of a 'core alliance' and a 'stable and hegemonic "historical bloc"' [2] need to be unpacked. The methodological point and the substantive point are related; without detailed evidence on interest construction, broad brush analysis is more likely to assume that incumbents are all alike.

Another implication relates to how 'ideas' or 'discourses' are seen within analyses of energy transitions. Here, we saw that incumbents deployed different types of ideas, at different levels (and arguably with different audiences in mind). Specific ideas relating to the details of policy (for example 'missing money' and 'slippery slope') were deployed for officials, whereas the idea that there was a looming capacity shortage in which the lights might 'go out' was deployed to the public (and ultimately to politicians) via the media. Within Kingdon's [76] multiple streams framework, this might also be seen as incumbents being active in both the 'problem' and 'policy' streams (see also Kern and Rogge [77]).

Distinctions like this point to the need for a conceptual schema that goes beyond a single notion of 'idea' or 'discourse'. For example, [78,79] usefully distinguishes between types of ideas according to whether they are in the foreground or background of debate, and whether they are cognitive ideas (such as those used in policy debates) or normative ideas (intended to galvanise action). The study of transitions, and in particular, the action of incumbents within change, would benefit from the wider use of such distinctions.

In the literature on the use of ideas in policy change, the conditions under which such use is likely to have greater or lesser effect is of central interest. Kern [7] argues that the 'room to manoeuvre' in processes of policy change is constrained by existing institutions, both by their practices they engender and by the background ideas (what Campbell (1998) would call 'paradigms') that typically support institutions. He goes on to say that 'New storylines also face difficulties when they challenge dominant discourses that have been embedded in powerful formal, institutional arrangements.' ([7]: 1129). The notion of deep-seated dominant discourses [2] preventing the emergence of new ideas in transitions is a central part of the 'regime' idea, as well as in framework such as Unruh's [1] 'techno-institutional complex'.

Here, however, the picture was more complex, as there was no single dominant institutional discourse or paradigm, but rather several, competing for traction. The market-led paradigm has played a central role in UK energy policy thinking since the 1980s (Rutledge 2010), and despite claims of paradigm change (Helm 2005), is still regularly used as a principle. The minority view amongst the Big Six and the IGG fell firmly within this paradigm, i.e. that energy-only markets should be left alone to do their work, but despite this it did not prevail. This was because an alternative idea, that system security would be threatened by a surge in variable renewables, proved ultimately to be more powerful. This situation of relative fluidity is a reminder of Blyth's (2002) basic point that ideas are particularly important under conditions of uncertainty, particularly relevant once energy transitions have been embarked upon. But it is also a reminder that in the original formulation in the socio-technical approach, regimes were conceptualised as sets of rules or ideas that were only *semi*-coherent [80]. Keeping this in view is important for not over-estimating the inevitability of lock-in [1] and the coherence of dominant discourse coalitions [2].

Given the analysis of the Capacity Market presented here, what can be done? Is it possible to mitigate regime resistance, structural dependency of government and capture by incumbents in the process of energy transition? We argue that what is needed to address these challenges (certainly in the British context) is a radical change in the institutional context. The Capacity Market is but one example of a wider set of problems with governance in the energy transition in Britain, including other examples of incumbent capture [81] and a failure of coordination. Current governance does not complement the technological, business and social changes underway, and change that is occurring is often happening in spite of, rather than because of, that governance.

The most fundamental principle is the need for an *intellectual coordination of energy governance*, involving the development of a vision of the future energy system, and the setting of a clear direction for policy and regulation, through an *open, transparent and legitimate process that is independent of short-term political pressures, and not vulnerable to capture*.

At the moment, Britain (and many other countries) lacks a formal home for such a process, which is why we propose the establishment of a new consensus-building and direction setting body (which might be called an Energy Transformation Council or something similar). The Committee on Climate Change cannot provide this function, as its remit is not to take a view between different technological or social pathways; rather it is only meant to show the various ways in which carbon budgets can be met cost-effectively. Like the National Infrastructure Commission, the CCC is also ultimately a technocratic body, whereas a

body with a specific remit to set the direction of energy policy, within boundaries of sustainability set by the CCC, would need not technical expertise, but also input from all key social and economic constituencies, somewhat like the Just Transmission Commission established by the Scottish Government.[33] However, unlike that Commission such a body would need to be permanent, at least over the course of the energy transition. It would need to gather formal and informal feedback from all stakeholders operating within the energy system, and to continuously monitor and review the progress of policies. Our proposal thus goes beyond previous calls for some form of technical Energy Agency in the UK. There are no obvious precedents for such an approach in Britain, although there are some models elsewhere, such as the Energy Agreement for Sustainable Growth in the Netherlands [82].

To try to avoid capture, we also argue that such a body would have to produce a more level playing field, by proactively providing a platform and analytical resources to a range of actors from outside of the incumbents, including new entrants, NGOs and expert independents, as part of the policy development process. This would have the effect of increasing the amount of evidence, in ways that the government might itself not think of, and provide a useful testing of arguments.

Radical institutional change is often resisted. However, the case of the CM shows that conventional governance arrangements for policy change in a case like Britain are not fit-for-purpose during major energy system transformations.

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References to submissions by companies to the December 2010 EMR Consultation and to the consultation on the proposals for a capacity mechanism in Annex C of the EMR White Paper in July 2011 are denoted by square brackets, e.g. [83,67]. They can be accessed respectively at: https://www.gov.uk/government/consultations/electricity-market-reform and https://www.gov.uk/government/consultations/possible-models-for-a-capacity-mechanism.

Appendix 1: Interviews

A number of interviews were conducted between July 2016 and January 2018 for the research underlying this paper (see Table A.1), which also covered other aspects of the development of the Capacity Market. Interviewees were identified on the basis of their involvement or closeness to the Capacity Market policy development process, with some identified through a snowballing process. Because the roles and expected knowledge of the different interviewees differed, a semi-structured design approach to the interview questionnaires, balancing focus on the key issues with openness and a tailoring of appropriate questions to respondents, was adopted [84,85]. A draft text of the analysis, involving interpretation of material from the interviews, was sent to interviewees for confirmation [35].

Table A.1
Interviews.

No.	Date	Position at time of CM process	Role in process
1	19 July 2016	Head of NGO	Observer
2	12 July 2016	Political advisor in government 2010–2012	Government participant
3	19 July 2016	Regulation director in a Big Six company	Observer from within incumbent
4	21 July 2016	Manager in a Big Six company	Participant from within incumbent
5	27 July 2016	Senior official in DECC	Government participant
6	23 February 2017	Policy manager in a Big Six company	Participant from within incumbent
7	17 May 2017	Consultant	Consultant and observer
8	9 June 2017	Consultant	Observer
9	28 June 2017	Staff member in UK Business Council for Sustainable Energy	Participant
11	20 July 2017	Commercial energy lawyer	Observer
12	19 October 2017	Head of regulation in a Big Six company	Participant from within incumbent
13	10 January 2018	Director of demand side response aggregator	Participant from within aggregator

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